S.B. Roll. No.....

APPLIED MATHEMATICS-II
2nd Exam/Common/0553/Jun'2022
(For 2018 Batch Onwards)

Duration: 3Hrs. **M.Marks:75**

SECTION-A

Q1. a) Choose the correct answer. **15x1=15**

i. $\lim_{x\to 0}\frac{\sin x^\circ}{x}$ = a) 1 b) π c) $\frac{\pi}{180}$ d) –π

ii. If $x = acos^3t,\ y = asin^3t$, then $\frac{dy}{dx}$ is equal t a) cot t b) cos t c) cosec t d) $-\tan t$

iii. The order of differential equation $(\frac{d^4y}{dx^4})^2 + 3(\frac{d^2y}{dx^2})^4 + y = 0$ is a) 4 b) 2 c) 8 d) 1

iv. $\int_1^2 \log x dx =$ a) log $(\frac{2}{e})$ b) log 4 c) log $(\frac{4}{e})$ d) log 2

v. The derivative of cos^2x^2 with respect to x is equal to
a) $2x\sin(2x^2)$ b) $2x\cos(2x^2)$ c) $-2x\sin(2x^2)$ d) $-2x\cos(2x^2)$

b) State True or False.

vi. For tangent parallel to X-axis, $\frac{dy}{dx} = 0$

vii. Function is said to be odd if f(-x)= f(x) .

viii. $\int\frac{g'(x)}{g(x)}dx = \log g(x) + c$

ix. If $y = \log(\sin x)$, then $\frac{dy}{dx} = \cot x$

x. Every LPP admits an optimal solution.

c) Fill in the blanks.

xi. If $y = \log x$, then $\frac{d^2x}{dy^2}$ is equal to _____

xii. The restrictions in the form of inequalities on the variables in a LPP are called _____

xiii. If $\int_{-a}^{a} f(x)dx = 0$, then f is an _____ function.

xiv. The differential co-efficient of a constant is _____.

xv. $\int\frac{1}{\sqrt{a^2-x^2}}dx$ =_____

SECTION-B

Q2. Attempt any six questions. **6x5=30**

a. Evaluate $\lim_{x\to 1}\frac{\sqrt{3+x}-\sqrt{5-x}}{x^2-1}$

b. Find equation of the tangent to the curve $y = x^4 - 6x^3 + 13x^2 - 10x + 5$ at (1,3).

c. Evaluate $\int\frac{e^x}{e^{2x}+6e^x+13}dx$

d. If $x = a(\theta + \sin\theta); y = a(1-\cos\theta)$, find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{2}$.

e. Find the area bounded by the curve $y = 4x - x^2$, the x-axis and the ordinates $x = 1$ and $x = 3$.

f. Evaluate $\int_1^2\frac{x^3}{\sqrt{x-1}}dx$

g. Differentiate $e^{\tan x}$ w. r. t. $\sin x$.

h. Find $\frac{d^4y}{dx^4}$ if $y = x^3\log x$

SECTION-C

Q3. Attempt any three questions. **3x10=30**

i. Find the maximum or minimum values of the function $2x^3 - 21x^2 + 36x - 20$

ii. The velocity of a body moving in a straight line at different times is given below:

t(sec)	0	1	2	3	4	5
v(m/sec)	4	3.98	3.87	3.55	2.83	0.61

Evaluate the distance in 5 sec

iii. Integrate $\int x^2sin^2x\,dx$ iv. Solve the differential equation $sec^2y\frac{dy}{dx} + 2x\tan y = x^3$.

iv. Solve the following linear programming problem graphically
Maximize and Minimize $z = x + 2y$, subject to the constraints
x+2y ≥ 100
2x-y ≤ 0
2x+y ≤ 200
x, y ≥ 0